PART III — REMstar Choice LS Nasal CPAP System

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1.1 SPECIFICATIONS

CPAP Pressure Range: 2.5 - 20 cm H_2O

Physical Dimensions: Weight: <6.0 lbs. (2.72 kg)
Height: 9.0 in. (22.9 cm)
Width: 5.75 in. (14.6 cm)

Filtering Capabilities: A reusable and an optional 0.3 micron disposable filter.

Pressure Stability: Within ±1 cm H_2O with 70 l/min leak over time and operating conditions.

Electrical Requirements:

Input Voltage Settings: 115 / 230 VAC; 12-24 VDC

Input Voltage Range: 100-130 / 200-260 VAC; 12-24 VDC

Power Consumption: The maximum power required to operate a REMstar Choice LS is 125 VA. The actual power used is dependent on the prescription pressure and usage (breathing) pattern. The lower the patient's prescription, the lower the power required. Typical requirements are less than 100 VA.

Fuse Specification:

Unit Voltage Setting	Fuse Type
115 VAC	800 mA, 5 x 20 mm T Type
230VAC	400 mA, 5 x 20 mm T Type

Current Requirements: When the voltage selector switch is set to 115 VAC, the maximum steady state current will not exceed 800 mA and is more likely to be 700 mA or less. When the voltage selector switch is set to 230 VAC, the maximum steady state current will not exceed 400 mA and is more likely to be 350 mA or less.

NOTE: The power cord supplied with the REMstar Choice LS is a 2-prong plug because the unit is double-insulated.

Battery Specifications for DC Power Operation:

The REMstar Choice LS unit can be operated in a motor vehicle that has a working cigarette lighter and a fully charged Deep Cycle Battery (see below). For pressures of 11 cm H_2O and below, connect the unit to the cigarette lighter using a Respironics DC Cord. For pressures greater than 11 cm H_2O, connect the unit to the cigarette lighter using a DC Interface module.

WARNING: The unit must be connected to a system that has a negative ground.

Polarity: On the plug end, the outside of the barrel is ground, and the inside is positive. On the cigarette lighter adapter end, the center pin is positive and the outside tab is ground.

At pressures of 11 cm H_2O and below, and using a Respironics DC cord to a 12 V battery:

Power Consumption: 40 Watts maximum

Current Requirements: The maximum current will not exceed 2.5 Amps DC.

Battery Size Recommended: 12 VDC Deep Cycle Battery with 30 Amp hour rating (minimum) for 8 hours of use.

NOTE: For proper operation, the battery voltage should remain above 11.5 Volts for the expected time of use.

At pressures greater than 11 cm H_2O, and using a Respironics DC Interface Module:

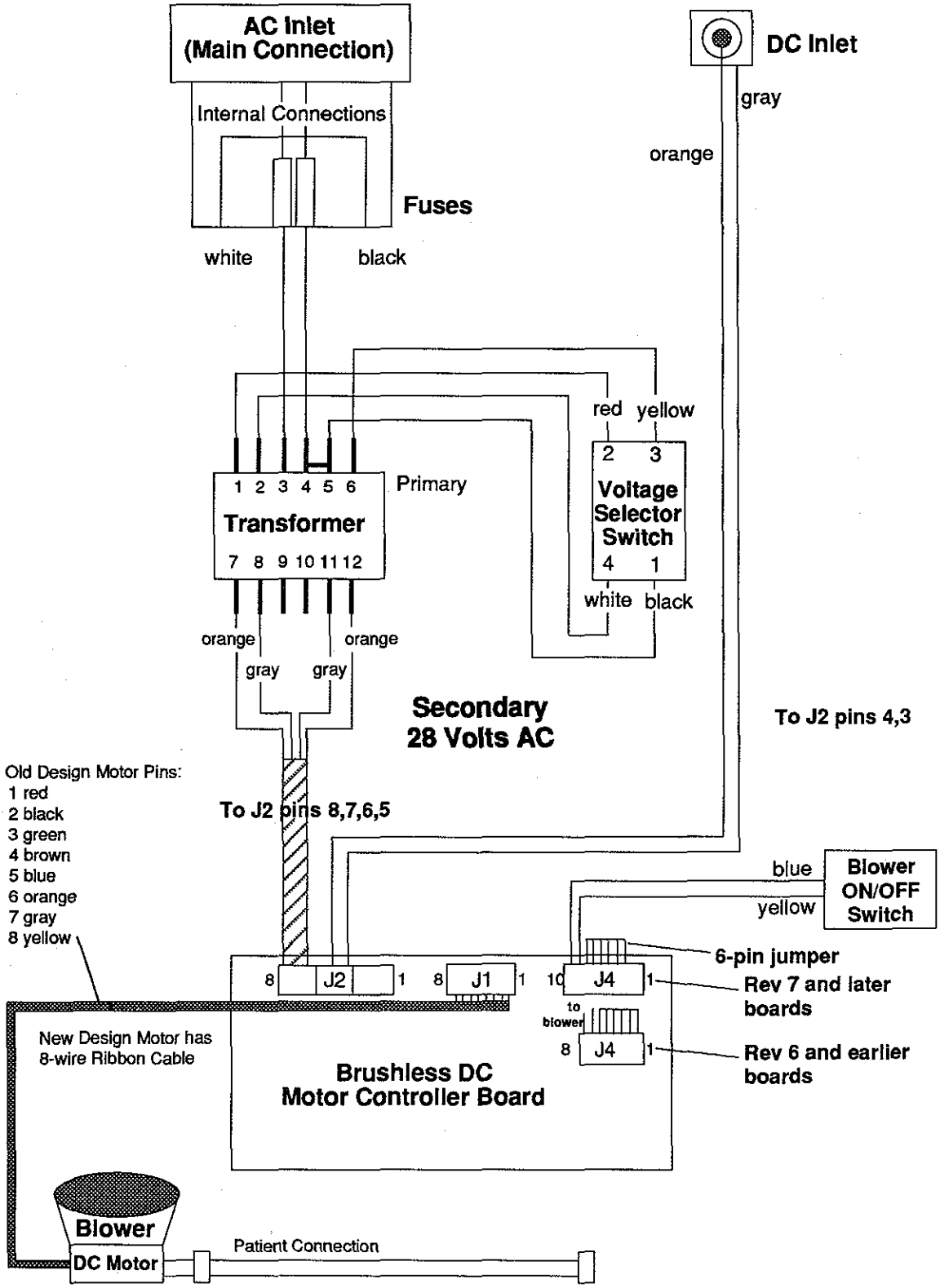
Power Consumption: The maximum power required to operate a REMstar Choice LS is 80 Watts. The actual power used is dependent on the prescription pressure and usage (breathin) pattern. The lower the prescription pressure, the lower the power required. Typical requirements are less than 50 Watts.

Current Requirements: The maximum steady state current will not exceed 7 Amps DC. Actual use will vary according to prescription pressure and usage pattern, but is likely to be 3.5 Amps DC.

Battery Size Recommended: 12 VDC Deep Cycle Battery with 90 Amp hour rating (minimum) for 8 hours of use.

NOTE: For proper operation, the battery output must not fall below 11.5 Volts. If this occurs, the module will emit a buzzing sound.

1.2 INTERNAL WIRING DIAGRAM



2.1 WARNINGS, CAUTIONS, AND NOTES

WARNINGS

- U.S. Federal law restricts the sale or the use of this device to be on the order of a licensed physician only.
- If the patient presents a contamination risk to the unit, a bacteria filter may be placed in-line between the unit and the patient. The following filters are recommended:
  Respirgard-II
  Perma systems BAC-Trap
  Other filters may be unacceptable due to high pressure drops.
- All patient settings must be determined via appropriate diagnostic testing and monitoring.
- The Whisper Swivel® is designed to exhaust CO_2 from the patient circuit. Continuous flow is required for safe operation. DO NOT BLOCK OR OTHERWISE TRY TO SEAL THE SLOTS ON THE WHISPER SWIVEL.
- Oxygen supports combustion. Oxygen should not be used while smoking or in the presence of an open flame.
- Disinfectant residues left on the patient circuit parts may shorten their useful life and irritate the patient's skin. Rinse all items thoroughly after disinfection.
- To avoid electrical shock, unplug the REMstar Choice LS unit before cleaning it.
- To avoid electrical shock, disconnect the electrical supply before changing the fuses.
- For continued protection against risk of fire, replace fuses with those of the same type and rating only.
- Performance verification must be performed prior to delivery of the REMstar Choice LS unit to the patient.
- The unit is powered when the cord is connected to the main supply. The on/off switch enables/disables the blower only.

CAUTIONS

- The unit must be positioned on its base for proper operation.
- The voltage selector switch must be set for proper line voltage (in North America; 115 V).
- Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

NOTES

- Only patient tubing with a smooth inner lumen and a nominal inner diameter of 3/4 in. (22 mm fitting) should be used. The overall length of the tubing should not exceed fourteen (14) feet.

2.2 ADJUSTING THE PRESSURE AND RAMP TIME TO THE PATIENT'S PRESCRIPTION

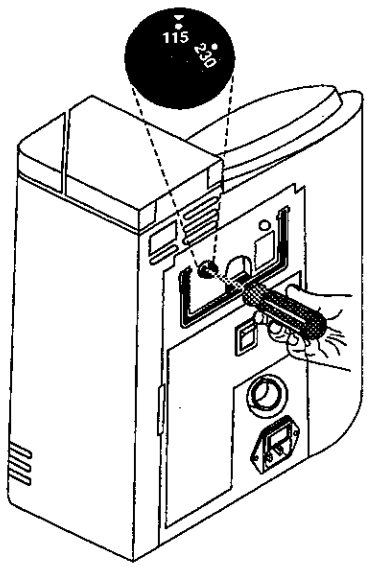
WARNING: If the REMstar Choice LS unit has been exposed to either very hot or very cold temperatures, allow the unit to adjust to room temperature before beginning the Setup and Adjustment procedures.

NOTE: To perform REMstar Choice LS installation and set up properly, you will need a manometer capable of reading pressure in centimeters of water and a straight-shank, slotted screwdriver (smaller than 1/8 in.). For ease in pressure verification, an O_2 Enrichment Attachment is available from Respironics (P/N 312710), but is not required.

STEP 1 Set up the REMstar Choice LS System

a. Voltage/Fuse Adjustment:

Make sure the voltage selector switch on the back of the unit is set with the correct supply voltage opposite the triangle. Use a standard slotted screwdriver to change the voltage if necessary. Refer to the user instruction manual for appropriate voltage settings.



NOTE: If you change the voltage setting, the fuses must also be changed. The Remstar Choice LS is packed with two sets of fuses. One set of fuses is for travel to countries with a different supply voltage. The other set is for replacement of blown fuses in the country of purchase. Refer to the user instruction manual for instructions on how to change the fuses. If a fuse blows immediately after replacement, the unit should be returned for servicing.

b. Connect the patient circuit to the unit. Either an NRV-2 or a Whisper Swivel may be used in the circuit. It is preferable to use the type of circuit on which the patient was tested.

c. **Option 1** - Connect manometer tubing to the outlet port on the mask (Figure 1).

- or -

Option 2 - Remove the mask from the circuit and replace it with an O2 Enrichment Attachment. Connect the manometer tubing to the outlet port on the attachment (Figure 2).

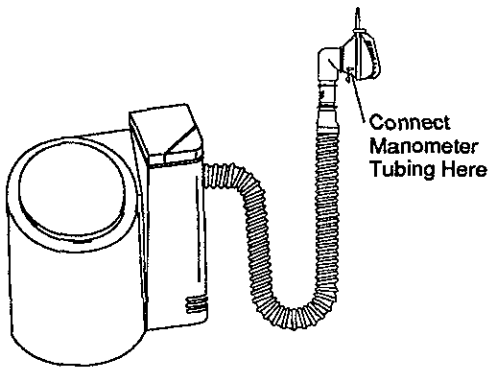


Figure 1

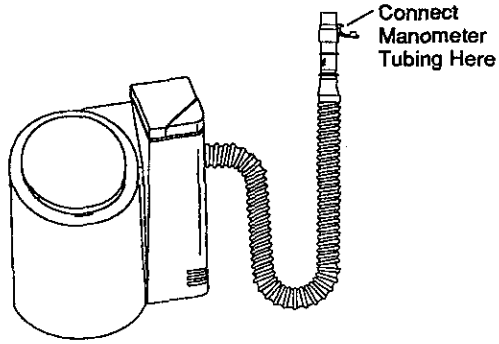


Figure 2

d. Connect the other end of the manometer tubing to a manometer.

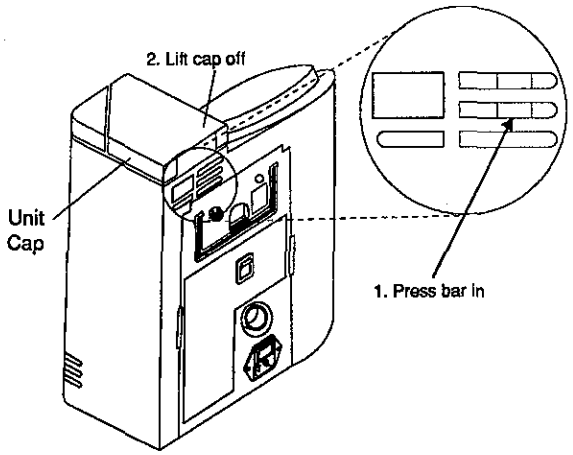
e. Plug one end of the power cord into the back of the unit and the other into an electrical outlet. **The unit will automatically turn ON.**

NOTE: The electronic circuits used in REMstar Choice LS are designed to turn the unit ON when power is supplied. This is to ensure the patient receives CPAP therapy following a power outage while the patient is sleeping.

STEP 2 Adjust the Pressure and Ramp Time to the Patient's Prescription

a. The pressure control knob and the ramp time control knob are under the unit's cap. To remove the cap, locate the three slots on the rear of the unit in the upper left corner. Behind the top two slots is a vertical bar which holds the cap in place. Use a slotted screwdriver (or other tool), to press in firmly on the bar while lifting the cap from back to front.

b. Occlude the circuit outlet either at the mask or at the O_2 Enrichment Attachment. Observe the delivered pressure on the manometer.

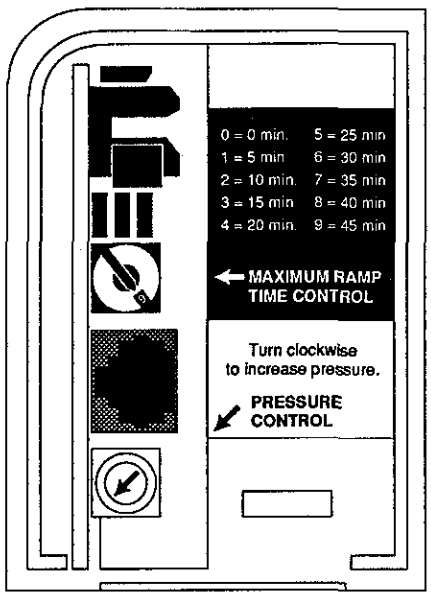


c. Using a slotted screwdriver or your fingers, set the prescribed pressure setting.
To increase the pressure, slowly turn the pressure control knob clockwise.
To decrease the pressure, slowly turn the pressure control knob counter-clockwise.
One full turn will adjust the unit from the lowest to the highest pressure.

d. Open the circuit outlet and then occlude again to verify the pressure reading on the manometer. Readjust if necessary.

e. Adjust the maximum ramp time control to the patient's prescribed time. The corresponding time for each setting is shown on the label. If no ramp is prescribed, set the control to "0".

Example: If the control is set to 4, the maximum ramp time is 20 minutes.


0 = 0 min. 5 = 25 min
1 = 5 min 6 = 30 min
2 = 10 min. 7 = 35 min
3 = 15 min 8 = 40 min
4 = 20 min. 9 = 45 min
MAXIMUM RAMP TIME CONTROL
Turn clockwise to increase pressure.
PRESSURE CONTROL

f. Snap the unit cap into place:

- Start by positioning the unit cap above the rectangular tower, slightly in front of the unit.
- Position the front of the cap into place and slide toward the back.
- Press down on the rear of the cap to secure.

3 ROUTINE MAINTENANCE

The REMstar Choice LS unit should be inspected annually. After inspection, fill out the maintenance chart in the Patient Instructions so that the patient will have a record of all maintenance performed.

- Verify the prescription pressure as shown in Section 2 of this manual. If the pressure reading is incorrect, refer to Section 4 "Troubleshooting."

- Filters should be replaced as recommended below or more frequently if necessary. Refer to Section 6 "Repair and Replacement" for detailed instructions on filter cleaning and/or replacement.

  White Disposable Filter: Replace once per month, or sooner if necessary.
  Gray Reusable Filter: Wash once per month and replace every six months.

  To wash the gray reusable filter, rinse the filter in a steady stream of running water. Squeeze out the water and rinse again. The filter may be air dried on a rack for 8 to 12 hours or in a clothes drier on high for 15 to 20 minutes. If you are drying the filter with other articles, allow the filter to remain in the drier throughout the entire drying cycle.

- Check the fuses. Because visual inspection can be difficult on slow blow fuses such as the ones used in the REMstar Choice LS, check them for continuity using an ohmeter. If either fuse measures open circuit or appears darkened in any spot, replace both fuses. Refer to Section 6 "Repair and Replacement" for detailed instructions on fuse replacement.

- Clean the exterior of the unit as needed with a soft cloth using warm water and a mild detergent.

- Check the Whisper Swivel®, if used, for dirty or occluded slots.

4.1 TROUBLESHOOTING

NOTE: For detailed replacement instructions, refer to Section 6.

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

If you require technical assistance during any of these troubleshooting procedures, call:

Respironics Technical Service Department 800-722-4271.
Monday through Friday - 7:30 a.m. to 4:30 p.m. EST

Problem	Possible Causes	Corrective Action
Unit plugged in to power outlet but no air blows out.	Power cord is not firmly connected to the unit or the power cord is not plugged into a working socket.	Check that the power cord is firmly connected to the unit. Check that the power cord is plugged into a working socket (by using a known working lamp, etc.).
	Voltage selector switch is set to wrong voltage.	Verify proper voltage setting. If unit is set at 230 V, but plugged into a 115 V line, the unit will not operate. If unit is set at 115 V, but is plugged into a 230 V line, the fuses will blow.
	The unit fuse(s) is blown.	Unplug the unit and check the fuses. Because visual inspection can be difficult on slow blow fuses such as those used in the REMstar Choice LS, check them for continuity using an ohmeter. If either fuse measures open circuit or appears darkened in any spot, replace both fuses. * If the fuses blow again, there is a problem in either in the circuit board or the blower: 1. Visually inspect the circuit board for any "hot" spots and replace it if any are detected. 2. Verify that the blower is operating correctly by plugging it into connector J1 of a spare circuit board (or the board of another unit). Also, plug in the transformer at J2 to bring power to the new circuit board. Adjust it through the full range of pressures. If the blower does not operate properly, replace the blower. Remove the fuse drawer from the AC Inlet. See Section 4.2.3. Inspect the drawer for damaged springs.

Problem	Possible Causes	Corrective Action
Unit plugged into power outlet, but no air blow out. (continued)	If using 12 volt DC source, check that the system polarity uses a negative ground.	See Section 1 for additional DC system specifications.
	Line voltage may have fallen below 93 VAC when using a 115 V voltage source or below 186 VAC when using a 230 V voltage source. The internal components will not function if this occurs.	Verify that the line voltage is adequate.
	Motor wire is not securely plugged into the J1 position on the circuit board.	Check motor wire connection.
	Transformer is faulty or wiring connections are not complete.	Unplug the unit. Remove the cover and the main circuit board. Check the continuity of the wiring connections from the AC inlet to the transformer, from the transformer to the circuit board, and from the transformer to the voltage selector switch. **WARNING:** AC voltage will be exposed with the cover off and the unit plugged in. Plug the unit into the AC supply. Use care when making measurements. Verify the transformer primary voltage by measuring between pins 3 (white) and 4 (black). The voltage should be the same as the input voltage source (100-130 VAC or 200-260 VAC). Verify the transformer secondary voltage by measuring between each set of orange and grey wires. The voltage should be approximately 15.5 ± 1.0 VAC. If the primary voltage is not the same as the input voltage, there is fault in the AC inlet, the primary wiring, or the voltage selector switch. Repair as needed. Refer to the wiring diagram for assistance. If there is primary voltage, but no secondary voltage, the transformer is faulty. Replace the transformer.

Problem	Possible Causes	Corrective Action
	Blower assembly is faulty.	Replace blower assembly. If the problem continues, the problem is in the circuit board, since the transformer and wiring have been checked.
	Main circuit board is faulty.	Replace main circuit board.
Unit starts and stops erratically.	Power cord is not firmly connected to the unit or the power cord is not firmly connected into a working socket.	Check that the power cord is firmly connected to the unit. Check that the power cord is plugged into a working socket (by using a known working lamp, etc.).
	Blower malfunction.	Replace the blower.
	Transformer is faulty or wiring connections are not complete.	Unplug the unit. Remove the cover and the main circuit board. Check the continuity of the wiring connections from the AC inlet to the transformer, from the transformer to the circuit board, and from the transformer to the voltage selector switch. **WARNING:** AC voltage will be exposed with the cover off and the unit plugged in. Plug the unit into the AC supply. Use care when making measurements. Verify the transformer primary voltage by measuring between pins 3 (white) and 4 (black). The voltage should be the same as the input voltage source (100-130 VAC or 200-260 VAC). Verify the transformer secondary voltage by measuring between each set of orange and grey wires. The voltage should be approximately 15.5 ± 1.0 VAC. If the primary voltage is not the same as the input voltage, there is fault in the AC inlet, the primary wiring, or the voltage selector switch. Repair as needed. Refer to the wiring diagram for assistance. If there is primary voltage, but no secondary voltage, the transformer is faulty. Replace the transformer.

Problem	Possible Causes	Corrective Action
Unit starts and stops erratically. (continued)	Main circuit board is faulty.	Replace main circuit board.
Unit delivers inadequate pressure.	Filter(s) are dirty or clogged.	Replace filter(s) and instruct patient on proper care as detailed in the user instructions.
	Leak in patient circuit.	Check for proper mask fit and that the mask is not damaged or in need of replacement. Check for any leaks at the joints in the patient circuit (i.e. mask/NRV-2 or Whisper Swivel, tubing to unit or NRV/Whisper Swivel). If leaks or damage are discovered, replace as needed.
	Leak internal to the unit.	Check that blower outlet is completely installed into blower outlet flexible coupling and not blocking blower air flow. Remove the cover as in Section 5. If necessary re-install the blower into the coupling. Check that blower sealing tape is installed completely around the blower joint, especially at the blower outlet. Check that all three blower assembly fasteners are properly installed (snapped into position). Check the integrity of the joints of the parts attached to the blower top. Replace blower top if necessary.

Problem	Possible Causes	Corrective Action
Unit delivers inadequate pressure. (continued)	Blower or main circuit board malfunction.	Check if the pressure can be adjusted with the potentiometer on the circuit board throughout the operating pressure range. Refer to Section 2 for detailed instructions. If the pressure range is not fully adjustable, follow the steps below. Step 1: Check blower by plugging it into another circuit board. If the blower functions properly, replace the circuit board. Refer to Section 6 for detailed instructions. Step 2: Check circuit board by plugging another blower into it. If the new blower functions properly, replace the blower. Refer to Section 6 for detailed instructions.
	Low line/battery voltage.	Verify that the line voltage has not fallen below 93 VAC when using a 115 V line voltage source or 186 VAC when using a 230 V voltage source. If operating from a battery, verify that the battery voltage has not fallen below 11.5 VDC.
Unit delivers excessive pressure.	Blower or main circuit board malfunction.	Check if the pressure can be adjusted with the potentiometer on the circuit board throughout the operating pressure range. Refer to Section 2 for detailed instructions. If the pressure range is not fully adjustable, follow the steps below. Step 1: Check blower by plugging it into another circuit board. If the blower functions properly, replace the circuit board. Refer to Section 6 for detailed instructions. Step 2: Check circuit board by plugging another blower into it. If the new blower functions properly, replace the blower. Refer to Section 6 for detailed instructions.

Problem	Possible Causes	Corrective Action
Air from unit seems too warm.	The air temperature at the patient end of the six-foot tubing should be no more than fifteen (15) degrees F above the temperature of the air at the inlet. Before checking the actual air temperature rise, check the following: room air temperature has risen; room humidity has increased; air inlet filter (particularly the white disposable one) has become blocked or dirty; patient's condition has changed (has a fever).	Replace filter(s) if dirty, and instruct patient on proper care as detailed in the patient instructions. Take measures to have patient decrease the room air temperature or humidity.
	Humidifier is being used with hot water.	Instruct patient to use cool or lukewarm water in the humidifier.
	Unit is next to radiator or other heat source (e.g. hot air vents, light bulbs).	Move the unit away from the heat source.
	Blower or main circuit board malfunction.	Check if the pressure can be adjusted with the potentiometer on the circuit board throughout the operating pressure range. Refer to Section 2 for detailed instructions. If the pressure range is not fully adjustable, follow the steps below. Step 1: Check blower by plugging it into another circuit board. If the blower functions properly, replace the circuit board. Refer to Section 6 for detailed instructions. Step 2: Check circuit board by plugging another blower into it. If the new blower functions properly, replace the blower. Refer to Section 6 for detailed instructions.

Problem	Possible Causes	Corrective Action
Excessive noise or vibration.	Possible blower malfunction.	Replace the blower.
Pressure fluctuations of ± 1.0 cm H_2O or greater exist.	Blower or main circuit board malfunction.	Plug alternate blower assembly into circuit board. If the new blower functions properly, check the integrity of the green/red/black motor wires on the old blower. Repair if required, or install new blower. If the new blower has the same symptom, replace the circuit board.
	Main circuit board is faulty.	Replace main circuit board.
	Unit operated with water level too high in the humidifier.	Remove excess water from the humidifier.
Pressure won't go below approximately 5 cm H_2O.	Blower or main circuit board malfunction.	Plug alternate blower assembly into circuit board. If the new blower functions properly, check the integrity of the orange/blue/brown motor wires on the old blower. Repair if required, or install new blower. If the new blower has the same symptom, replace the circuit board.
Unit does not operate on 230 V, but does on 115 V.	Fuses need to be replaced.	Fuse type may be incorrect. Fuses must be changed when the voltage setting is changed: **Unit voltage setting:** 115 VAC **Fuse type:** 800 mA, 5 x 20 mm T **Unit voltage setting:** 230 VAC **Fuse type:** 400 mA, 5 x 20 mm T Check the fuses. Because visual inspection can be difficult on slow blow fuses such as the ones used in the REMstar Choice LS, check them for continuity with an ohmeter. If either fuse measures open circuit or appears darkened in any spot, replace both fuses.

Problem	Possible Causes	Corrective Action
Unit does not operate on 230 V, but does on 115 V. (continued)	Transformer needs to be replaced.	Unplug the unit. Remove the cover and the main circuit board. Check the continuity of the wiring connections from the AC inlet to the transformer, from the transformer to the circuit board, and from the transformer to the voltage selector switch. **WARNING:** AC voltage will be exposed with the cover off and the unit plugged in. Plug the unit into the AC supply. Use care when making measurements. Verify the transformer primary voltage by measuring between pins 3 (white) and 4 (black). The voltage should be the same as the input voltage source (100-127 VAC or 200-250 VAC). Verify the transformer secondary voltage by measuring between each set of orange and grey wires. The voltage should be approximately 15.5 ± 1.0 VAC. If the primary voltage is not the same as the input voltage, there is fault in the AC inlet, the primary wiring, or the voltage selector switch. Repair as needed. Refer to the wiring diagram for assistance. If there is primary voltage, but no secondary voltage, the transformer is faulty. Replace the transformer.
Ramp function does not work.	Maximum ramp time control (under unit cap) is set to zero.	Adjust the maximum ramp time control to the patient's prescribed time, as indicated on the label inside near the controls. Set Ramp Adjustment Knob to maximum.
	Inside of ramp switch cap is broken.	Remove unit cap and check that the ramp function works when the optical switch on the circuit board is interruped with a screwdriver or piece of paper. If the ramp function is operable, replace the unit cap.
	Main circuit board malfunction.	Replace the main circuit board.

Problem	Possible Causes	Corrective Action
Unit will not turn off when switched.	Power switch is not connected to main circuit board.	Remove the unit's cover and verify that the unit power switch is plugged into the main circuit board.
	Main circuit board malfunction.	Replace the main circuit board.
Optional remote control not functioning.	Location of unit is beyond the remote control's range (15 ft.), or unit is positioned so that the remote control sensor openings are blocked.	Move the unit within the remote control's range and position the unit so that the sensor openings (right side on the front of unit or left side on the back of the unit) are facing the remote control.
	Remote control is broken or the battery needs to be replaced.	A green light will appear inside the end of the remote control if it is functioning properly. If the light does not appear when the buttons are pressed, replace the battery in the remote control (refer to Section 2 for instructions). If the remote control still does not function, replace the entire remote control.
	Main circuit board malfunction.	Replace the main circuit board.

5.1 REMOVING THE COVER

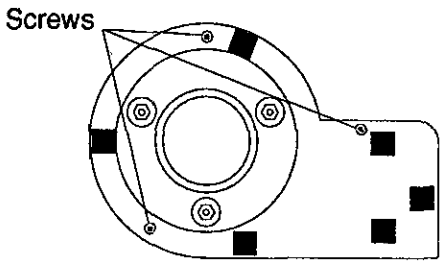
Tools Needed:

- Phillips Screwdriver
- Slotted Screwdriver, 3/16 in.

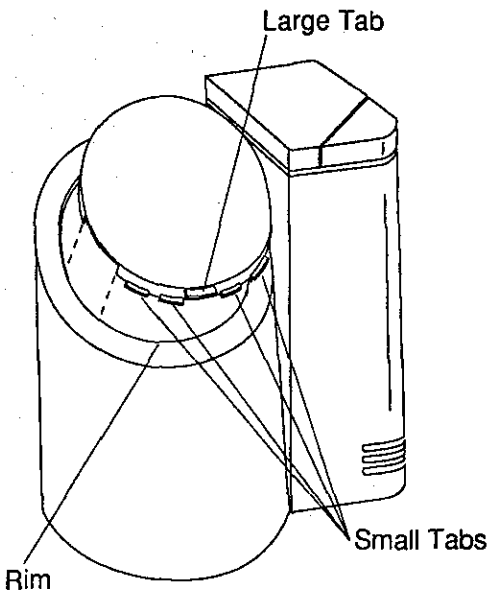
WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

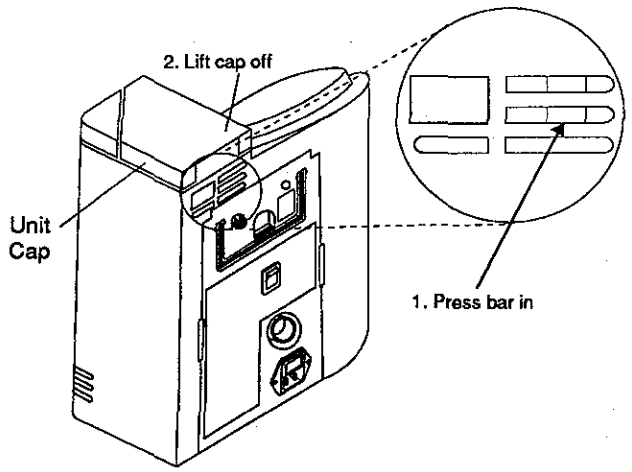
STEP 1 Lay the unit on its back. Using a Phillips screwdriver, remove the three screws in the bottom of the unit. Set the unit upright.



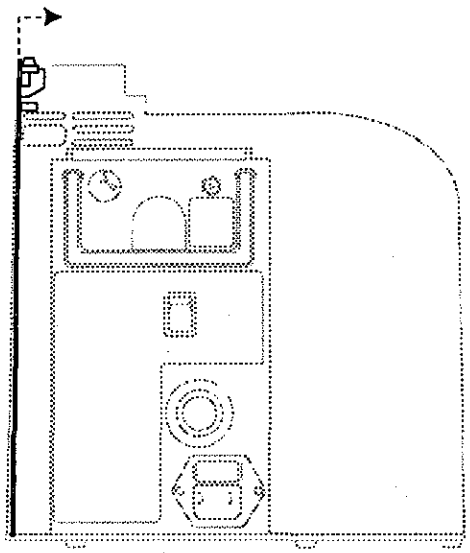
STEP 2 Remove the filter cap by gently pulling up on one side of the cap. Remove the gray filter and white filter by gently pulling around the edges of the filters.



STEP 3 To remove the unit's cap, locate the three slots on the rear of the unit in the upper left corner. Behind the top two slots is a vertical bar which holds the cap in place. Use a slotted screwdriver (or other tool), to press in firmly on the bar while lifting the cap from back to front.

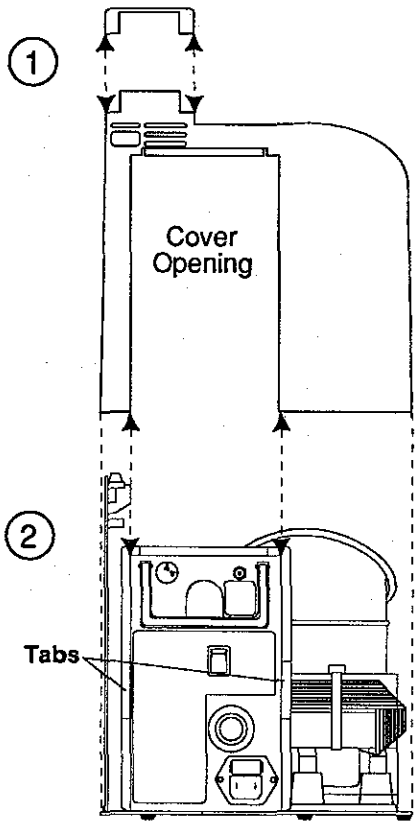


STEP 4 Before the cover can be removed, the circuit board must be disengaged from the side of the cover. Using a pair of long needle nose pliers (3/32 in. or smaller tip), grasp the circuit board at the top and lift it up approximately 1/4 inch out of the groove in the cover and over to the right approximately 1/4 inch to free it from the cover.



CAUTION: Do not lift the circuit board by pulling up on any of the board's components.

STEP 5 Grasp the cover in both hands and begin to lift it off the unit while slightly pushing the cover away from you. The cover may tend to get stuck where the three screws were attached, or on the left side, where the printed circuit board is located. If so, reach underneath the raised cover and pull it outward, away from the unit.



5.2 REPLACING THE COVER

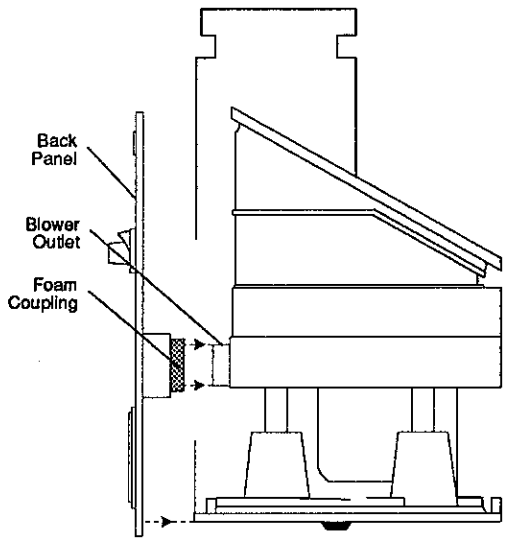
Tools Needed:

- Phillips Screwdriver

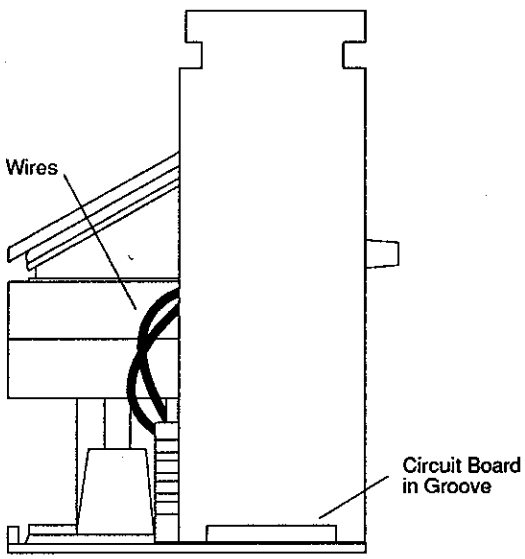
WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

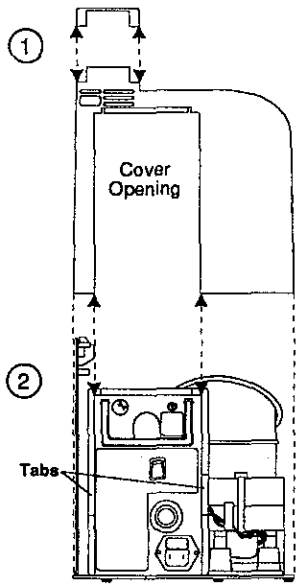
STEP 1 Set the unit upright. Position the unit as shown. Make sure that the blower outlet is fully inserted into the foam coupling located on the inside of the back panel of the unit. If the outlet is not in place, gently press the back panel and the blower together until the outlet is in place.



STEP 2 Make sure that the six connectors are securely connected to the citcuit board. Position the circuit board in the groove on the base. Check that the two wires between the blower and the transformer are pushed toward the blower.



STEP 3 Position the cover over the unit. Starting on the left side, make certain that the opening on the back of the cover is lining up with the back panel of the unit. Slide the cover down, while pushing it forward. Verify that the cover slides properly between the tabs on the unit back. Move the circuit board slightly to the right so that it protrudes through the opening in the top of the cover. Continue sliding the cover down until it snaps over the base of the unit.

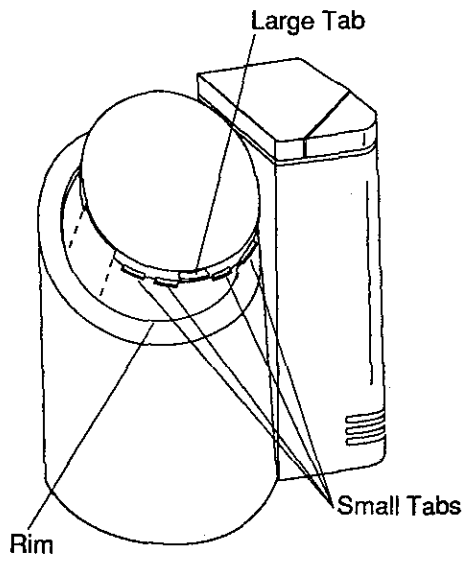


STEP 4 Lift the circuit board up and over approximately 1/4 inch, and place it in the groove on the cover.

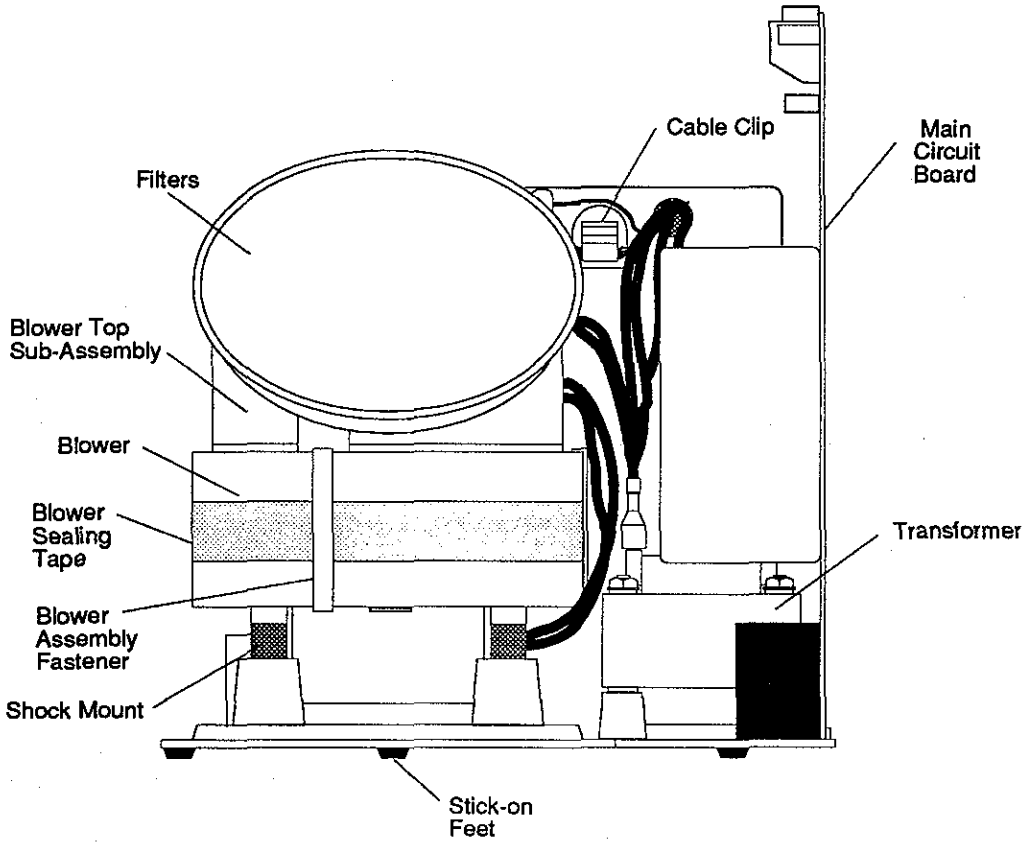
STEP 5 Tilt the unit onto its back. Make sure that the cover fits snugly around the base. If it does not, lift it back off of the unit and replace it again. Check the wire positions. Re-install the three screws into the bottom of the unit. Recommended tightening torque: 3 inch-lb.

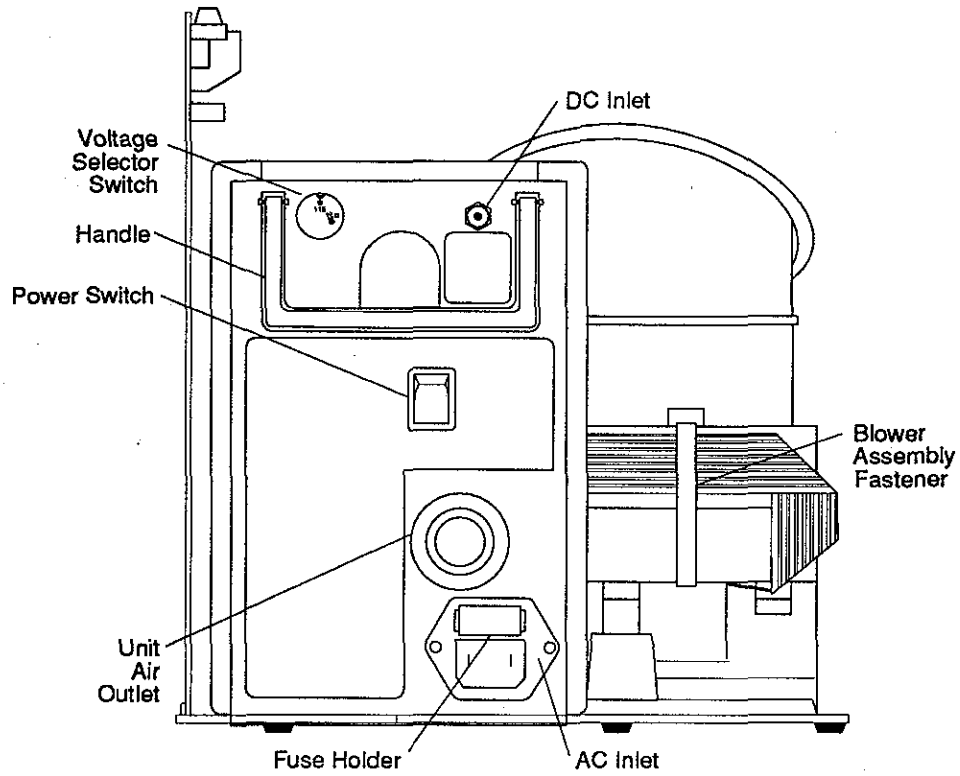
NOTE: If using an electric screwdriver, the speed must be set on SLOW.

STEP 6 Set the unit upright. Replace the white filter (if being used). Hold the gray filter with the notched edge facing down and gently tuck the filter's edge in under the lip of the unit. Replace the filter cap by inserting the four small inner tabs on the bottom of the cap inside the bottom of the unit's rim. The large tabs on the filter cap should be on the outside of the rim. Firmly press down on the top of the filter cap to snap the top tabs into place. Replace the unit's cap on the tower of the unit.



6.1 COMPONENT LOCATIONS





Any items not discussed in this section are not field-replaceable. Contact the Respironics Technical Service Department for information.

If you require technical assistance during any of these repair and replacement procedures, call:

Respironics Technical Service Department 800-722-4271
Monday through Friday - 7:30 a.m. to 4:30 p.m. EST

6.2 REPLACING THE BLOWER

Part #362532

Included with the Replacement Kit:

- Complete Blower Assembly
- 6-32 Nut w/ Lockwasher (3 each)
- Foam Tape (1 each)

Additional Supplies Needed:

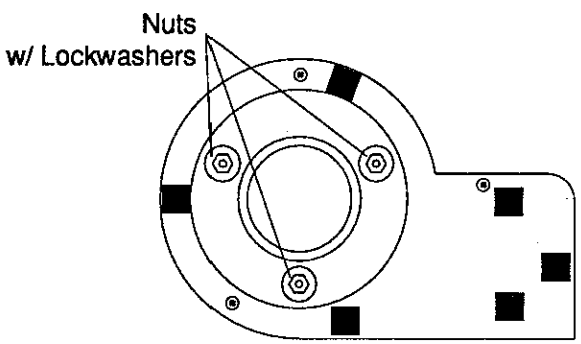
- Threadlock (e.g. LOCTITE® 222 or omniFIT® 1150)
- 5/16 in. Socket Driver
- Phillips Screwdriver

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

STEP 1 Remove the cover (refer to Section 5 for detailed instructions).

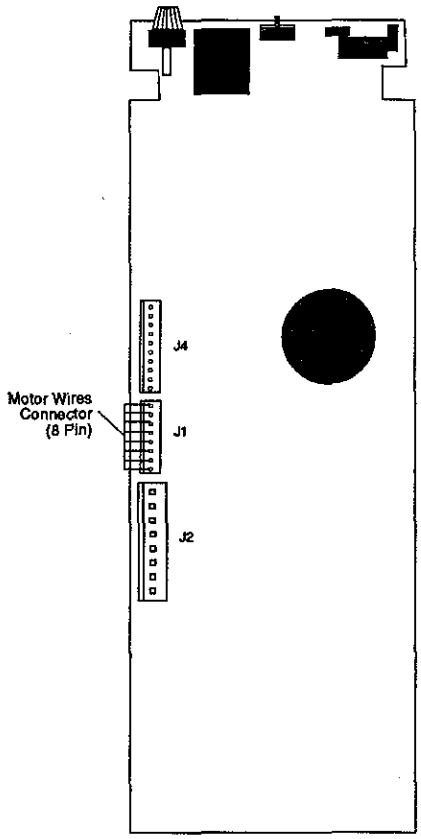
STEP 2 Lay the unit on its back. Using the 5/16 in. socket driver, remove the three nuts with lock washers recessed into the bottom of the unit. If the blower shock mount begins to rotate, hold it steady with one hand while you remove the nut with your other hand.



STEP 3 Set the unit upright. Remove the circuit board from the groove in the base.

If the old blower has a ribbon cable:
Disconnect the red 8-pin connector from J1 on the circuit board. Pry the rear blower assembly fastener from the back of the blower (see page 6-1) to release the ribbon cable.

If the old blower has eight wire leads:
Disconnect the white 8-pin connector from J1 on the circuit board. Unlatch the black cable clip located on the back panel of the unit and remove the eight motor wires. Pull the motor wires out of the foam tape fastened to the blower.



STEP 4 Lift the existing blower assembly out of the unit and set it aside. Place the new blower assembly into the same three posts, making sure that the shock mount studs are inside of the posts.

STEP 5 Lay the unit on its back. Place one or two drops of threadlock onto either the shock mount studs or nuts and firmly tighten the shock mounts. If the shock mount begins to rotate, hold it steady with one hand while you tighten the nut with your other hand. Recommended Torque: 2 inch-lb.

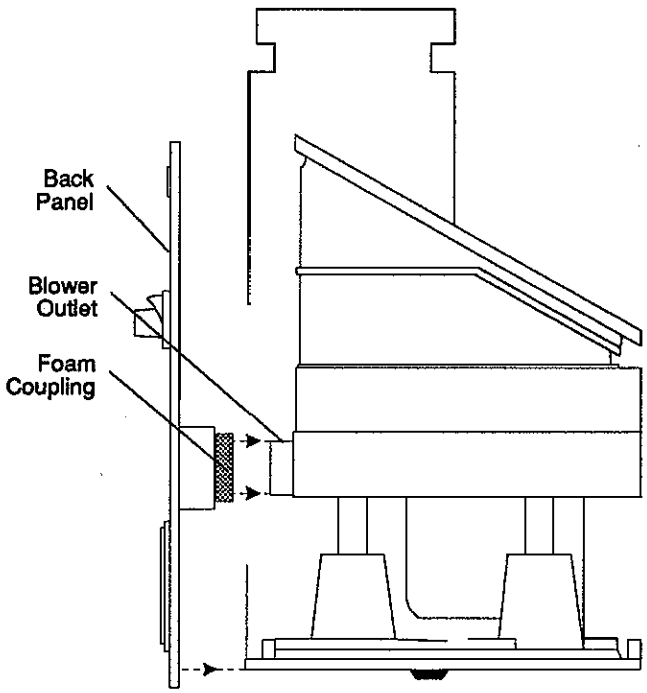
NOTE: The shock mounts must not be twisted or stretched beyond their free length. If necessary, loosen the nuts. Adjust the blower alignment. Torque with 2 inch-lb.

STEP 6 Set the unit upright with the back of the unit facing you. Route the ribbon cable around the blower back and between the two black transformer wires to the circuit board. Plug the red 8-pin connector into J1 on the circuit board; make sure the lock tabs are facing the edge of the circuit board. The connector should firmly lock into place.

STEP 7 **If the old blower had a ribbon cable:**
Replace the blower assembly fastener with the ribbon cable routed under it.

If the old blower had eight wire leads:
Pry the rear blower assembly fastener from the back of the blower (see page 6-1). Replace the blower assembly fastener with the ribbon cable routed under it.

STEP 8 Looking at the left side of the unit, make sure that the blower outlet is fully inserted into the foam coupling located on the inside of the back panel of the unit. If the outlet is not in place, gently press the back panel and the blower together until the outlet is in place.



STEP 9 Replace the cover (refer to Section 5 for detailed instructions).

STEP 10 Verify pressure reading following detailed instructions in Section 2. Reset pressure if required.

6.3 REPLACING THE BLOWER TOP ASSEMBLY

Part #362533

Included with the Replacement Kit:

- Complete Blower Top Assembly
- Blower Assembly Fasteners (3 each)
- Blower Sealing Tape (1 each)
- Wire Tape (1 each)
- Shock Mounts (3 each)
- 6-32 Nut w/ Lockwasher (3 each)

Additional Supplies Needed:

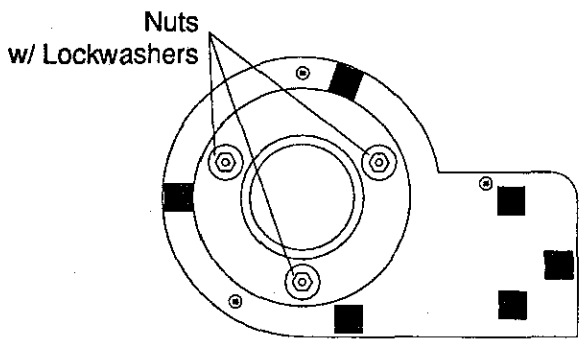
- Phillips Screwdriver
- Utility Knife or Cutting Blade
- 5/16 in. Socket Driver
- Threadlock (e.g. LOCTITE® 222 or omniFIT® 1150)
- Slotted Screwdriver (optional)

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

STEP 1 Remove the cover (refer to Section 5 for detailed instructions on removing and replacing the cover).

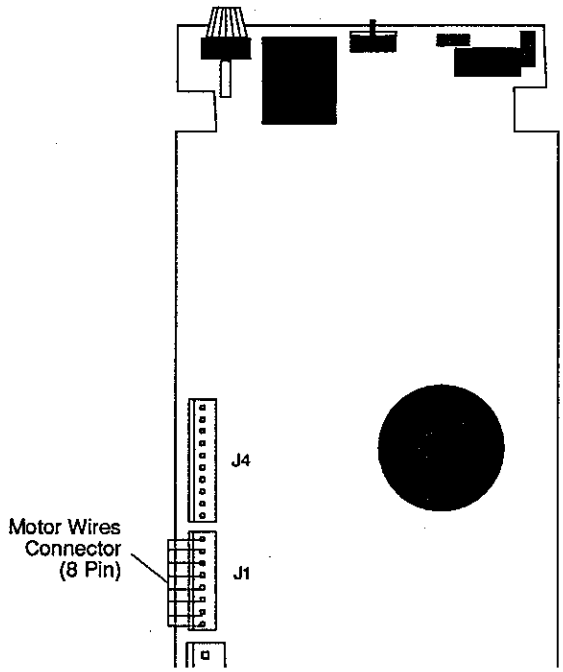
STEP 2 Lay the unit on its back. Using the 5/16 in. socket driver, remove the three nuts with lockwashers recessed into the bottom of the unit. If the blower shock mount begins to rotate, hold it steady with one hand while you remove the nut with your other hand.



STEP 3 Set the unit upright. Remove the circuit board from the groove in the base.

If the old blower has a ribbon cable: Disconnect the red 8-pin connector from J1 on the circuit board. Pry the rear blower assembly fastener from the back of the blower (see page 6-1) to release the ribbon cable.

If the old blower has eight wire leads: Disconnect the white 8-pin connector from J1 on the circuit board. Unlatch the black cable clip located on the back panel of the unit and remove the eight motor wires. Pull the motor wires out of the foam tape fastened to the blower.



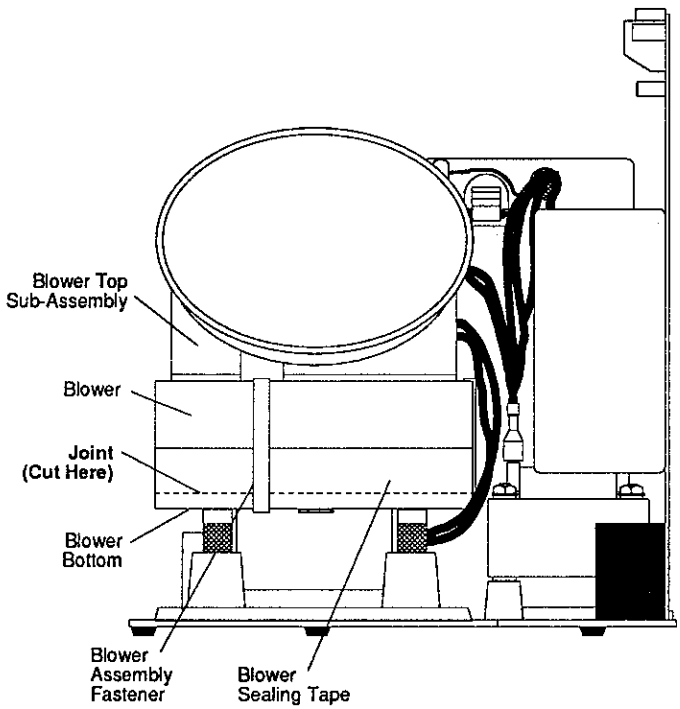
STEP 4 Lift the existing blower assembly out of the unit. Remove the three (3) blower assembly fasteners from the blower. You may need to use a slotted screwdriver to help pry the fasteners off. Discard the fasteners.

STEP 5 Find the joint between the blower top and bottom. Using a knife or cutting blade, cut along the joint all the way around the blower.

STEP 6 Gently lift the blower top from the blower, taking care not to contact the fan blade inside of the blower.

STEP 7 Place the new blower top assembly onto the blower, again taking care not to contact the fan blade. Make sure the blower top is aligned and fully seated.

STEP 8 Attach the blower sealing tape on top of the old tape starting on the very edge of the blower outlet and going all the way to the other edge. Tear off any excess tape.



STEP 9 Attach the two front-most blower assembly fasteners, making sure that they snap into the dimples located on the blower top and bottom. Do not attach the rear fastener.

STEP 10 Place the new blower assembly into the same three posts. Make sure that the shock mount studs are inside of the posts. The shock mounts can be replaced with the new ones if desired.

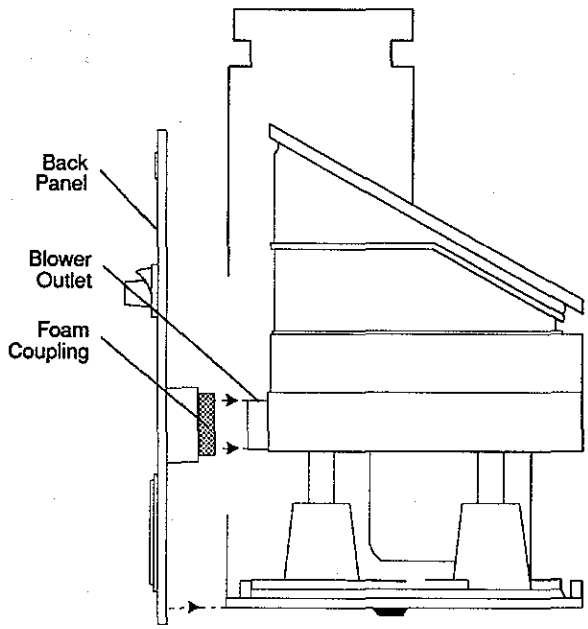
STEP 11 Lay the unit on its back. Place one or two drops of threadlock onto either the shock mount studs or nuts and firmly tighten the shock mounts. If the shock mount begins to rotate, hold it steady with one hand while you tighten the nuts with your other hand. Recommended Torque: 2 inch-lb.

NOTE: The shock mounts must not be twisted or stretched beyond their free length. If necessary, loosen the nuts. Adjust the blower alignment. Torque with 2 inch-lb.

STEP 12 Set the unit upright with the back of the unit facing you. Route the ribbon cable around the blower back and between the two black transformer wires to the circuit board. Plug the red 8-pin connector into J1 on the circuit board; make sure the lock tabs are facing the edge of the circuit board. The connector should firmly lock into place.

STEP 13 Replace the rear blower assembly fastener with the ribbon cable routed under it.

STEP 14 Looking at the left side of the unit, make sure that the blower ouotlet is fully inserted into the foam coupling located on the inside of the back kpanel of the unit. If the outlet is not inplace, gently press the back panel and the blower together until the outlet is in place.



STEP 15 Replace the cover (refer to Section 5 for detailed instructions).

STEP 16 Verify pressure reading following detailed instructions in Section 2. Reset the pressure if required.

6.4 REPLACING THE TRANSFORMER

Part #502031

Included with the Replacement Kit:

- Transformer
- 8-32 Nut w/ Lockwashers (4 each)
- Hex Head Screws (4 each)
- Base Label (1 each)
- Nylon Spacer Washers (2 each)
- Nylon Shoulder Washers (8 each)

Additional Supplies Needed:

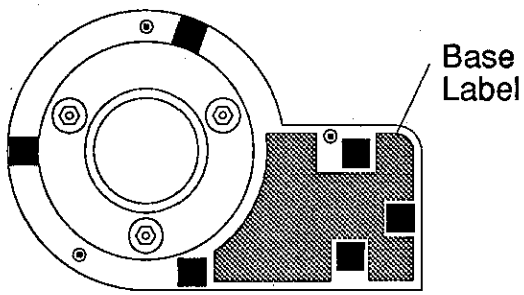
- 11/32 in. Socket Wrench
- Threadlock (e.g. LOCTITE® 222 or omniFIT® 1150)
- Isopropyl Alcohol or a Mild Soap Cleanser
- Needle Nose Pliers
- Phillips Screwdriver

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

STEP 1 Remove the cover (refer to Section 4 for detailed instructions).

STEP 2 Lay the unit on its back and remove the base label. Use isopropyl alcohol (or a mild soap cleanser) to remove any remaining adhesive.

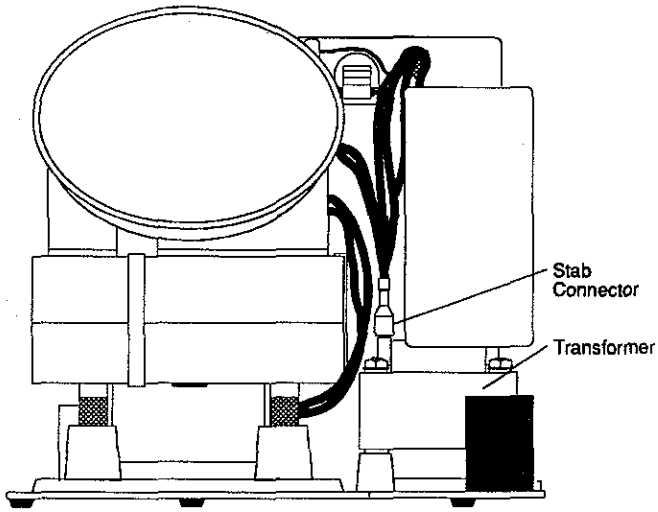


STEP 3 Set the unit upright. Lift the circuit board out of its groove and disconnect the four wire connectors. Set the circuit board aside onto conducting material or a grounded surface.

STEP 4 Using the needle nose pliers, remove the 10 stab connectors attached to the transformer. Push the wires out of the way.

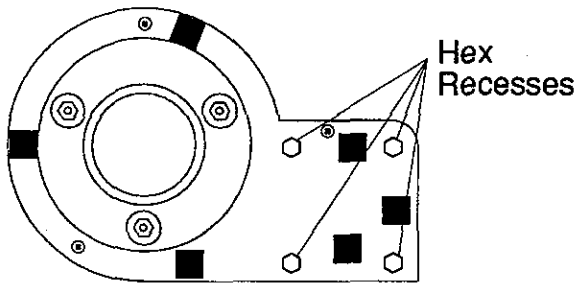
STEP 5 Using the 11/32 in. socket wrench, remove the four (4) nuts with lockwashers on the top of the transformer. Lift the transformer out of the unit.

STEP 6 If desired, you can replace the four (4) hex head screws holding the transformer in place. Place the two nylon spacer washers, if used, inside on the front two screws.



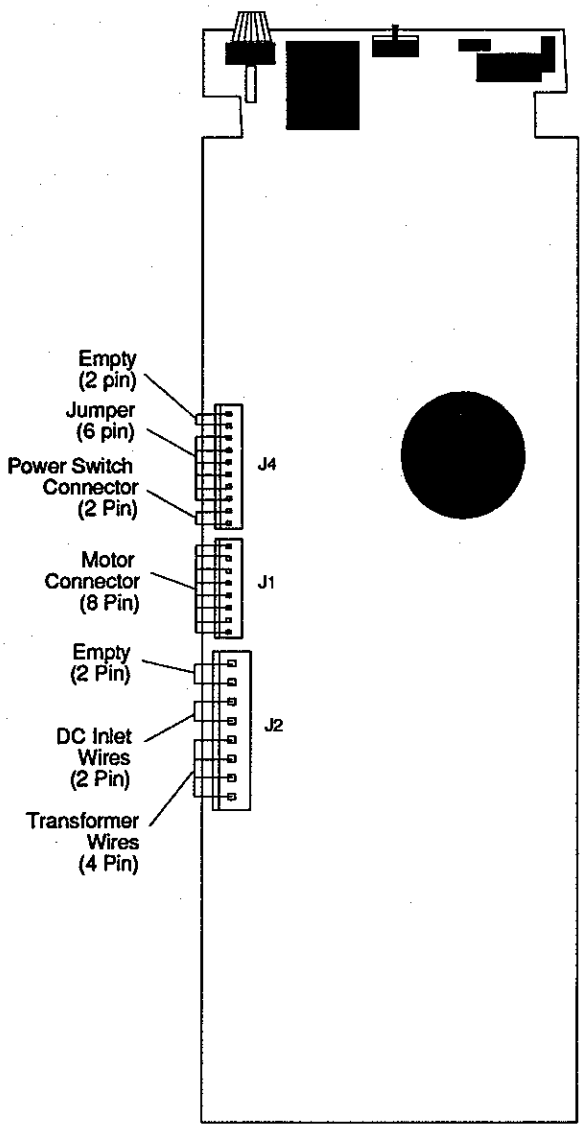
STEP 7 Place the new transformer on top of the screws. Make sure that all of the eight (8) shoulder washers are inside of the transformer and that the wires covered with black tape on the inside of the transformer are facing the outside of the unit (next to the circuit board).

STEP 8 Lay the unit on its back. Using the screwdriver, push the four screws inside the hex recesses in the bottom. If necessary, hold them in place while you place one or two drops of threadlock onto the threads of the screw ends. Tighten the nuts onto the screws. Tighten all four (4) nuts. Peel the back from the new base label and attach the label to the bottom of the unit.



STEP 9 Set the unit upright. Reconnect the wires with stab connectors according to the wiring diagram in Section 1.

STEP 10 Reconnect the wires to the circuit board as shown below and set the circuit board into the groove on the unit's base.



NOTE: For Rev. 6 boards, J4 is an 8-pin connector; the Power Switch takes two pins and the jumper takes the remaining six pins.

STEP 11 Replace the cover (refer to Section 5 for detailed instructions).

STEP 12 Verify pressure reading following detailed instructions in Section 2. Reset pressure if required.

6.5 REPLACING THE MAIN CIRCUIT BOARD

Part #502029

Included with the Replacement Kit:

- Main Circuit Board

Additional Supplies Needed:

- Phillips Screwdriver
- Slotted Screwdriver (smaller than 1/8 in.)

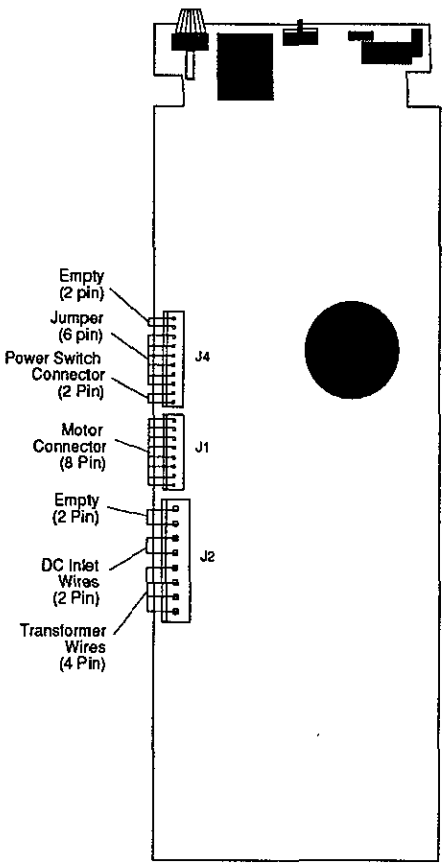
WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

STEP 1 Remove the cover (refer to Section 5 for detailed instructions).

STEP 2 Lift the circuit board out of the groove in the base and disconnect the four wire connectors and the 8-pin jumper.

STEP 3 Remove the new circuit board from the static protective bag. Reattach the four wire connectors and the 8-pin connector to the new circuit board as shown:



STEP 4 Return the old circuit board to Respironics in the same packaging.

STEP 5 Set the new circuit board into the groove on the unit's base.

STEP 6 Replace the cover (refer to Section 5 for detailed instructions).

STEP 7 Set the prescription pressure per the set up instructions in Section 2.

NOTE: J4 may be an 8-pin connector (for circuit boards equal to or earlier than Rev 6) or a 10-pin connector (for circuit boards equal to or later than Rev 7). For the REMstar Choice LS, only the first two pins are used (for the Power Switch connector). The next 6 pins are jumpered, and the last 2 pins are empty.

6.7 REPLACING THE POWER SWITCH

Part #502032

Included with the Replacement Kit:

- Power Switch with Wire Harness

Additional Supplies Needed:

- Phillips Screwdriver
- Needle Nose Pliers

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

STEP 1 Remove the cover (refer to Section 5 for detailed instructions).

STEP 2 Disconnect the power switch wire harness from the main circuit board.

STEP 3 Push the switch from behind to remove it from the back panel.

STEP 4 Feed the wires from the new switch through the back of the unit.

STEP 5 Snap the switch into the back panel with the terminals oriented to the bottom.

STEP 6 Reattach the power switch wire harness to the main circuit board.

STEP 7 Replace the cover (refer to Section 5 for detailed instructions).

6.11 REPLACING THE AC INLET

Part #502057

Included with the Replacement Kit:

- AC Inlet
- Screws (2 each)
- Fuse Holder

Additional Supplies Needed:

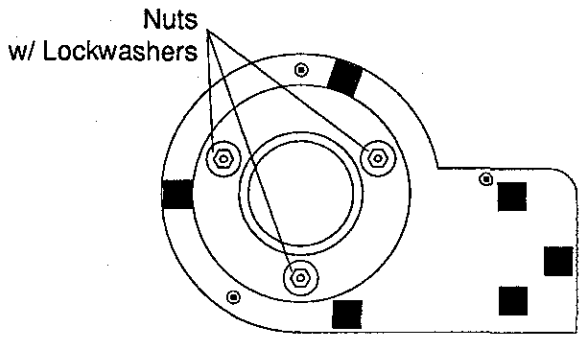
- Phillips Screwdriver
- Small Slotted Screwdriver (optional)

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

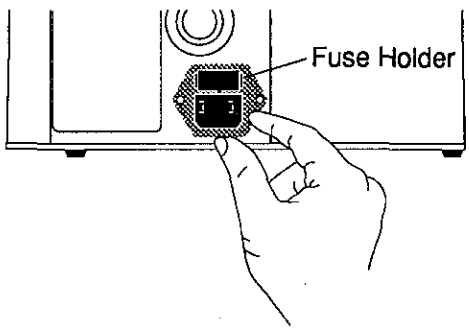
STEP 1 Remove the cover (refer to Section 5 for detailed instructions).

STEP 2 Lay the unit on its back. Using the 5/16 in. socket driver, remove the three nuts with lockwashers recessed into the bottom of the unit. If the blower shock mount begins to rotate, hold it steady with one hand while you remove the nut with your other hand.



STEP 3 Position the unit so that the front is facing you. Lift the existing blower assembly out of the unit's base and set it aside. Using the needle nose pliers, disconnect the two stab connectors from the back of the AC Inlet.

STEP 4 Position the unit so that the back is facing you. Remove the fuse holder by releasing the small tabs on the sides of the holder. You may need a small screwdriver to help remove the holder. Remove the fuses and set aside. Discard the fuse holder.



STEP 5 Remove the two screws on the sides of the inlet. Remove the AC Inlet and discard.

STEP 6 Insert the new AC Inlet into the back of the unit making sure the fuse holder is positioned on top. Insert the two screws and tighten to secure the new AC Inlet.

STEP 7 Remove the fuse holder from the new Inlet by releasing the small tabs on the sides of the holder. You may need a small screwdriver to help remove the holder. Place the fuses inside the holder. Insert the fuse holder back into the unit and snap into place.

STEP 8 Position the unit so that the front is facing you. Using the needle nose pliers, reconnect the two stab connectors on the back of the AC Inlet (with the front of the unit facing you, connect the white wire on the left side and the black wire on the right side).

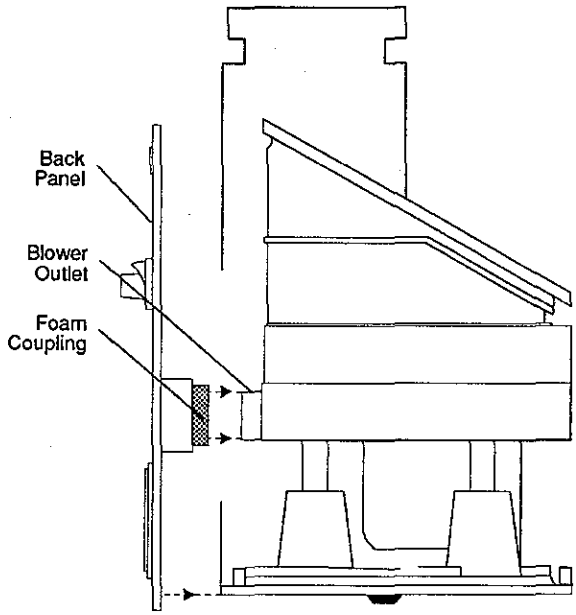
STEP 9 Set the blower assembly back into position on the three posts, making sure that the shock mount studs are inside of the posts.

STEP 10 Lay the unit on its back. Place one or two drops of threadlock onto either the shock mount studs or nuts and firmly tighten the shock mounts. If the shock mount begins to rotate, hold it steady with one hand while you tighten the nut with your other hand. Recommended Torque: 2 inch- lb.

NOTE: The shock mounts must not be twisted or stretched beyond their free length. If necessary, loosen the nuts. Adjust the blower alignment. Retorque to 2 inch-lb.

STEP 11 Looking at the left side of the unit, make sure that the blower outlet is fully inserted into the foam coupling located on the inside of the back panel of the unit. If the outlet is not in place, gently press the back panel and the blower together until the outlet is in place.

STEP 12 Replace the cover (refer to Section 5 for detailed instructions).



6.12 REPLACING THE HANDLE

Part #362535

Included with the Replacement Kit:

- Handle
- Handle Fasteners (2 each)

Additional Supplies Needed:

- Needle Nose Pliers
- Nut Driver (3/8 in.)
- Slotted Screwdriver (less that 1/8 in.)
- Phillips Screwdriver (#1 or #0)

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

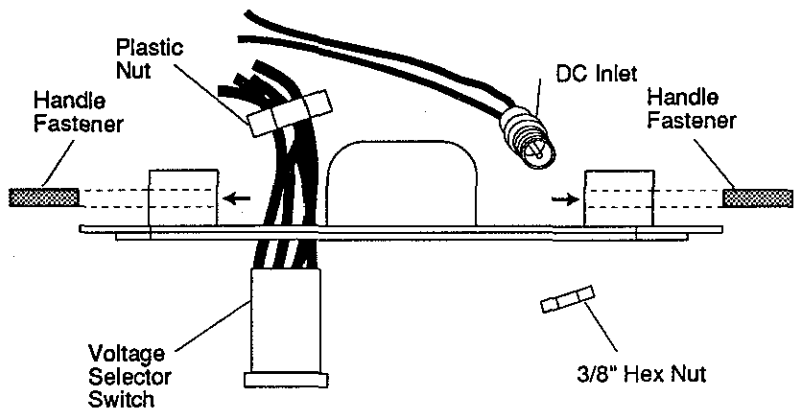
CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

STEP 1 Remove the cover (refer to Section 5 for detailed instructions).

STEP 2 Set the unit upright with the back panel facing you. Using the pliers and nut driver, completely loosen the nut on the voltage selector switch and DC inlet. Push the DC inlet through the back panel using care not to lose the lock washer. (You do not need to disconnect the wires.)

STEP 3 Line up the small slotted screwdriver with the inside edge of one of the handle fasteners and push it toward the outside of the back panel. Remove the handle fastener and discard it.

TOP VIEW OF BACK PANEL



STEP 4 Repeat with the handle fastener on the other side of the handle. Remove the handle.

STEP 5 Place the new handle into its recess, making sure that the side with the four round marks faces the unit.

STEP 6 Take one new handle fastener and place it, smooth end first, into the outside edge of the fastener opening. When the grooved end of the fastener begins to contact the back and you can no longer push by hand, use the pliers to finish engaging the handle fastener until it is flush with the back. Repeat with the other side.

STEP 7 Push the voltage selector switch and the DC inlet back into place in the back panel and tighten the nuts.

STEP 8 Replace the cover (refer to Section 5 for detailed instructions).

6.13 REPLACING THE COVER

Part #502132

Included with the Replacement Kit:

- REMstar Choice LS Enclosure Assembly
- Screws (3 each)

Additional Supplies Needed:

- Phillips Screwdriver

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

Refer to Section 5 for detailed instructions on removing and replacing the cover.

6.14 REPLACING THE UNIT CAP

Part #502131

Included with the Replacement Kit:

- REMstar Choice LS Unit Cap

Additional Supplies Needed:

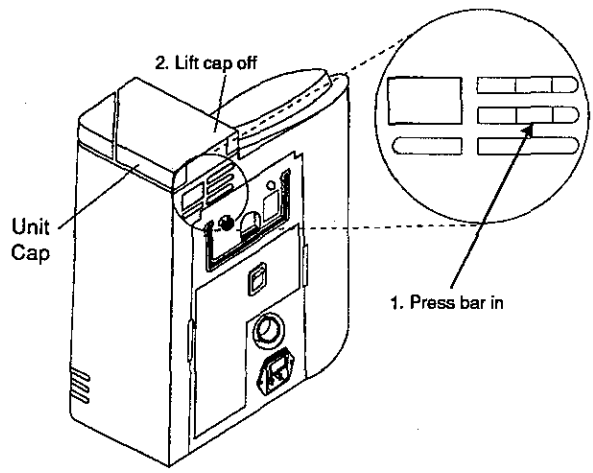
- Slotted Screwdriver

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

CAUTION: Electronic components used in this unit are subject to damage by static electricity. Use proper static discharge and grounding precautions when servicing the equipment.

STEP 1 To remove the unit cap, locate the three slots on the rear of the unit in the upper left corner. Behind the top two slots is a vertical bar which holds the cap in place. Use a slotted screwdriver (or other tool), to press in firmly on the bar while lifting the cap from back to front. Discard the cap.

STEP 2 Align the replacement cap and press down on the cap, from back to front, to snap it into place.



6.15 REPLACING THE STICK-ON FEET

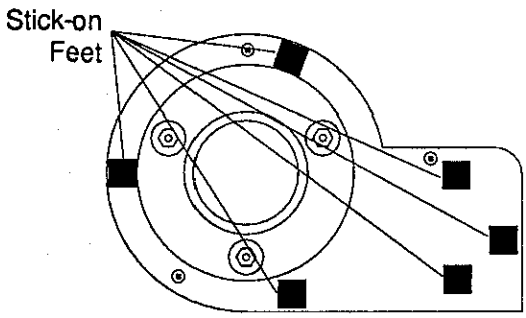
Part #362537

Included with the Replacement Kit:

- Stick-on Feet (6 each)

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

Lay the unit on its back. Remove the paper backing from the stick-on feet and attach them to the bottom of the unit in the places shown below:



6.16 REPLACING THE DISPOSABLE FILTER

Part #362522

Included with the Replacement Kit:

- Disposable Filters (package of 6)

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

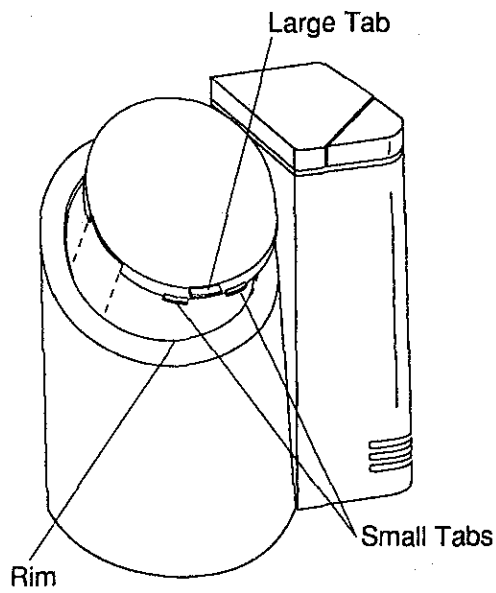
STEP 1 Remove the filter cap by gently pulling up on one side of the cap. Remove the gray filter by gently pulling around the edges of the filter.

STEP 2 Remove the white filter and discard. Replace with a new filter. Make sure the filter is laying flat.

STEP 3 Hold the gray filter with the notched edge facing down and gently tuck the filter's edge in under the lip of the unit.

STEP 4 Replace the filter cap by inserting the four small inner tabs on the bottom of the cap inside the bottom of the unit's rim. The large tabs on the filter cap should be on the outside of the rim. Firmly press down on the top of the filter cap to snap the top tabs into place.

NOTE: Disposable filters should be replaced once per month or sooner if necessary.



6.17 REPLACING THE REUSABLE FILTER

Part #362521

Included with the Replacement Kit:

- Reusable Filter (1 each)

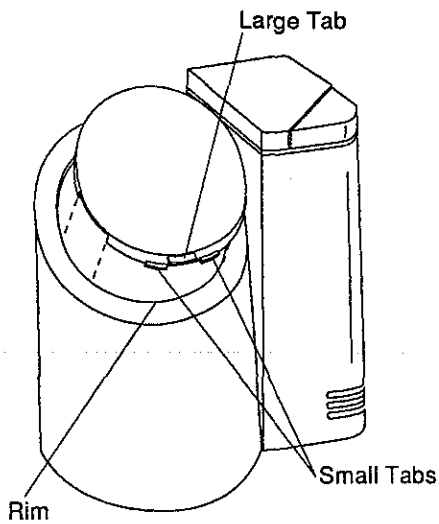
WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

STEP 1 Remove the filter cap by gently pulling up on one side of the cap. Remove the gray filter by gently *pulling around the edges of the filter.*

STEP 2 Hold the new filter with the notched edge facing down and gently tuck the filter's edges in under the lip of the unit.

STEP 3 Replace the filter cap by inserting the four small inner tabs on the bottom of the cap inside the bottom of the unit's rim. The large tabs on the filter cap should be on the outside of the rim. Firmly press down on the top of the filter cap to snap the top tabs into place.

NOTE: Reusable filters should be cleaned once per month or sooner if necessary. Replace every six months.



To Clean the Reusable Filter:

Rinse the filter in a steady stream of running water. Squeeze out the water and rinse again. Repeat several times. The filter may be air dried on a rack for 8 to 12 hours or in a clothes dryer on high for 15 to 20 minutes. If you are drying the filter with other articles, allow the filter to remain in the dryer throughout the entire drying cycle. For additional information, refer to the patient instructions.

THE FILTER MUST BE COMPLETELY DRY BEFORE USE.
NEVER PLACE A WET FILTER INTO THE REMstar CHOICE LS UNIT.

6.18 REPLACING THE FUSES

Part #362523 (800 mA) or #362527 (400 mA)

Included with the Replacement Kit:

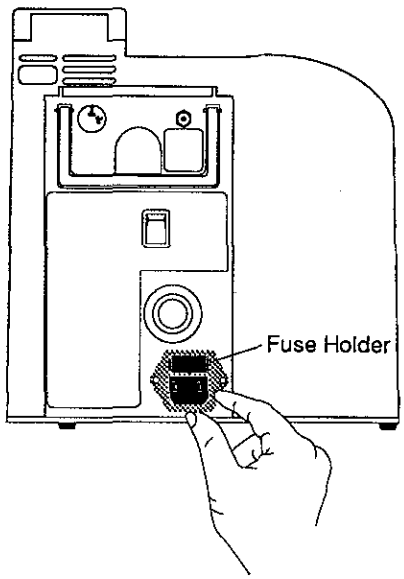
- Fuses (2 each)

Additional Supplies Needed:

- Small Slotted Screwdriver (optional)

WARNING: Electrical Shock Hazard: Disconnect the electrical supply before making repairs to the unit.

STEP 1 Remove the fuse holder by releasing the small tabs on the sides of the holder. You may need a small screwdriver to help remove the holder.



STEP 2 Replace the old fuses with new fuses of the same type and rating. Always replace both fuses. Refer to Specifications in Section 1.

STEP 3 Insert the fuse holder back into the unit and snap into place.